

*REMARKS/ARGUMENTS**The Pending Claims*

Claims 1-21 are pending. Claims 1-17 are directed toward a polishing pad comprising a porous polymeric material, wherein the porous polymeric material has a negative Poisson's ratio. Claims 18-21 are directed toward a method of polishing with the aforementioned polishing pad. Reconsideration of the claims is respectfully requested.

*Summary of the Office Action*

Claims 1-21 stand rejected under 35 U.S.C. § 103(a) as allegedly obvious over Reinhardt (i.e., U.S. Patent 6,095,902) in combination with Lakes (i.e., U.S. Patent 4,668,557) and Furukawa et al. (i.e., WO 03/058698 A1 (U.S. Patent Publication 2005/0107007 A1 as English language equivalent)), alone or in further combination with Sevilla et al. (i.e., U.S. Patent 6,126,532), Suzuki et al. (i.e., U.S. Patent 6,120,353), Osterheld et al. (i.e., U.S. Patent 6,241,596), and Tang (i.e., U.S. Patent 5,949,927).

*Discussion of the Obviousness Rejection*

The Office Action asserts that it would have been obvious to one of ordinary skill in the art to replace the conventional polyurethane foam in the polishing pad disclosed in Reinhardt with a polyurethane foam having a negative Poisson's ratio disclosed in Lakes to improve abrasion resistance, since Furukawa teaches that abrasion resistance is a desirable property of polishing pads and will increase the life of the polishing pad.

For subject matter defined by a claim to be considered obvious, the Office must demonstrate that the differences between the claimed subject matter and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103(a); see also *Graham v. John Deere Co.*, 383 U.S. 1, 148 U.S.P.Q. 459 (1966). The ultimate determination of whether an invention is or is not obvious is based on certain factual inquiries including: (1) the scope and content of the prior art, (2) the level of ordinary skill in the prior art, (3) the differences between the claimed invention and the prior

art, and (4) objective evidence of nonobviousness. *Graham*, 383 U.S. at 17-18, 148 U.S.P.Q. at 467.

*1. Scope and Content of the Prior Art*

Reinhardt generally discloses porous polishing pads comprising polyether and/or polyester polyurethanes. Reinhardt teaches that porous materials aid in the polishing due to their ability to hold and carry polishing slurry (col. 1, lines 17-26). Moreover, Reinhardt teaches that the final polymeric product preferably has certain physical properties, such as a specified tensile modulus, yield stress, tensile strength, and elongation to break, thereby making it suitable for polishing (col. 2, line 64, to col. 3, line 2). As acknowledged in the Office Action, Reinhardt fails to disclose or suggest a polishing pad comprising a porous polymeric material with a Poisson's ratio of less than zero, as recited in the pending claims.

Lakes discloses the use of negative Poisson's ratio material in cushions, plugs, air filters, shoe soles, sandwich panels, humidifier belts, sound absorbers, sponges, gaskets, and medical supplies (col. 4, line 47, through col. 6, line 2). However, Lakes fails to teach the use of negative Poisson's ratio material in the production of a porous polishing pad.

Furukawa discloses three requirements for polishing pads: (1) high polishing speed, (2) long life of the polishing pad, i.e., polishing pad materials must have high abrasion resistance, and (3) high planarizing ability (paragraphs 0007-0009). Furukawa further discloses that these three requirements can be achieved with a polishing pad comprising fabric and a *nonporous* resin (paragraph 0026). Specifically, Furukawa states that porous, i.e., closed cell and open cell, polymeric materials

have a drawback of clogging by precipitates in a relative short period of time.

Thus, in order to maintain a high polishing speed, it is necessary to remove the clogged region on the surface of the polishing pad with the dresser frequently.

Thus, they have-problems [sic] that long dressing time in a total during polishing is required and that the polishing pad has a short life.

(paragraph 0012). Thus, Furukawa teaches that the *structure* of porous materials is the cause of short pad life due to the requirement of increased pad conditioning and/or dressing time. As such, Furukawa teaches away from the use of a cellular polishing pad in general and fails

to teach the use of negative Poisson's ratio material in the production of a cellular polishing pad.

2. *Level of Ordinary Skill in the Art*

For the purposes of the present argument, one of ordinary skill in the art can be treated as someone with an advanced chemistry degree and at least a few years of experience in the field of chemical-mechanical polishing of substrates.

3. *Differences Between Claimed Invention and Prior Art*

In order to arrive at the present invention as defined by the pending claims, one of ordinary skill in the art, at the time of invention, would have had to ignore the stated preference of Furukawa for *nonporous* polymeric materials. Furukawa teaches that the pores of porous polymeric materials are easily clogged due to their *inherent structure* and require frequent dressing, with a resulting shortened pad life. Thus, contrary to the assertions of the Office Action, one of ordinary skill in the art at the time of the invention that would not have been motivated to replace one porous polymeric material, i.e., a positive Poisson ratio material, with another porous polymer material, i.e., negative Poisson ratio material, based on the disclosure of Furukawa alone or in combination with Reinhardt and Lakes.

4. *Objective Evidence of Unobviousness*

For purposes of the present argument, Applicants have no need to refer to any objective evidence of unobviousness of the present invention as defined by the pending claims.

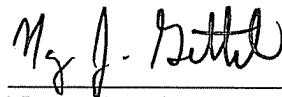
5. *Consideration of Graham Factors Together*

In view of the foregoing comments concerning each of the *Graham* factors, Applicants respectfully submit that the subject matter defined by the pending claims is unobvious over the combination of Reinhardt, Lakes, and Furukawa, and that the obviousness rejection should be withdrawn.

*Conclusion*

Applicants respectfully submit that the patent application is in condition for allowance. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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